

REMARKS/ARGUMENTS

Claims 1-16 and 18-25 are active.

Support for the amendments to Claim 1 and new claims 22-25 is found on page 4, line 18 to page 5, line 7.

No new matter is added.

Applicants appreciate the indication on page 8, item 7 of the Official Action that Claim 12 is directed to allowable subject matter. In view of the amendments and discussion submitted in this paper, it is requested that all pending claims be similarly allowed.

On pages 2-3 of the Official Action, the Examiner cites to Chesworth and Arbab to reject the claims under 35 USC 102 because they teach coated glass substrates and amongst the many options described include a silver layer, a dielectric layer, a zirconium layer and a zinc oxide layer.

Chesworth presents in example 9, a stack not including one layer of blocker containing zirconium; but two layers of blockers containing zirconium. This stack has the structure: Substrate/SnO₂/Zr /Ag / Zr / SnO₂ with the following thicknesses: 4 mm /40 nm /4 nm/8 nm/4.2 nm/38 nm.

In contrast, the claimed arrangement includes one metal barrier layer based on Zr placed above or below the silver layer. More specifically, Claim 1 defines a transparent substrate with at least one functional layer, one metal barrier layer based on Zr and at least one upper dielectric layer where

- (A) a barrier layer based on Zr is above and in contact with the silver functional layer and a upper dielectric comprising ZnO is in contact with

the barrier layer based on Zr that is diagrammatically represented as
Substrate . . /Ag/Zr/ZnO

- (B) a barrier layer based on Zr is below and in contact with the silver functional layer and an upper dielectric comprising ZnO above and in contact with the silver functional layer that can be diagrammatically represented as Substrate. . .Zr/Ag/ZnO; or
- (C) a barrier layer based on Zr is below and in contact with the silver functional layer and an upper dielectric comprising Ni-Cr, Ti or Nb above and in contact with the silver functional layer that can be diagrammatically represented as Substrate. . .Zr/Ag/ Ni-Cr, Ti or Nb.

On the basis of GB 2 129 831, cited in column 1, line 50 and column 2, line 15, Chesworth teaches increasing the thickness of the upper-blocker layer, or to divide the blocker into an upper-blocker and an under-blocker of the same material. In Chesworth there are two alternatives: (A) an upper-blocker only, but which excludes zirconium from the possible listed materials (see, e.g., Chesworth's Claim 1); or (B) an under blocker layer and an upper-blocker layer with the same material and listing zirconium as a possible material for both the under and upper-blocker layers (see, e.g., Chesworth's Claim 12).

In column 3, lines 44 to 47 Chesworth also describes that "*when additional metal is divided, with a part deposited on the top of the silver and a part deposited below the silver, zirconium is also effective like additional metal.*"

Accordingly, the claims cannot be anticipated by Chesworth and as such withdrawal of the rejection is requested.

Arbab describes a metallic reflective silver layer that can directly contact a zinc oxide layer (see col. 6, lines 50-53) and can include a primer layer composed of Zr, Ta, Nb, Ni, Cr, Cu, Al, Hf, mixtures, etc which is deposited over the substrate far side of the metallic layer (col. 7, lines 46-57). However, Arbab does not teach that the barrier layer based on zirconium is situated above and in contact with the functional silver layer (see pending Claim 1)

As noted in the specification on page 4, lines 13-16 the barrier layer composed of zirconium can be below or above the functional layer and as discussed in the specification on page 1, third paragraph, the basic arrangement of the claims was known but with other metals. Indeed, the specification on page 3, third paragraph, explains that the prior multi-layers had poor performance and were unsatisfactory. The specification provides a series of examples and comparative examples demonstrating the improved effect when zirconium is used as the barrier layer in conjunction with a ZnO based dielectric layer and a silver functional metal layer.

In particular, comparative Example 1 uses a nickel chromium barrier layer with the tin oxide dielectric layer where comparative Example 2 replaces the barrier layer with zirconium and as discussed on page 10 the replacement improves color retention, transmission and resistance. Example 1 employs a zirconium barrier and a ZnO dielectric layer with a final tin oxide layer, where Example 2 replaces that final tin oxide layer with a silicone nitride layer. Comparative Examples 1a and 2a vary the thickness but are generally the same as comparative Examples 1 and comparative Example 2, which have the same effect in terms of light transmission and other properties (see page 13 of the application). Example 3 and comparative Example 3 (on pages 14-15 of the application) compare the zirconium barrier layer and nickel chromium and the table on page 15 (table 8) demonstrates better reflection and more adept at withstanding heat treatment.

Reconsideration and withdrawal of the rejections applied under 35 USC 102 is requested.

The rejection of Claim 5 under 35 USC 103(a) citing Chesworth and Arbab was raised to allege that the protective layer, while not taught by Chesworth, would nonetheless be obvious in light of Arbab's teachings in col. 9. The rejection of Claims 13-16 and 18-21 under 35 USC 103(a) combining Chesworth with Coustet is to allege that the limitations of these dependent claims would have been obvious. The rejection of Claims 3-4 and 7 under 35 USC 103(a) combining Arbab and Chesworth is to allege that the lower barrier layer in claims 3-4 and thickness of silver layer in Claim 7 would have been obvious. The rejection of Claims 13-16 and 18-21 under 35 USC 103(a) combining Arbab with Coustet is to allege that the limitations of these dependent claims would have been obvious. However, for these dependent claims, as discussed in detail above in the rejections applied under 35 USC 102, the combination of art does not teach a transparent substrate with at least one functional layer, one metal barrier layer based on Zr and at least one upper dielectric layer where

- (D) a barrier layer based on Zr is above and in contact with the silver functional layer and a upper dielectric comprising ZnO is in contact with the barrier layer based on Zr that is diagrammatically represented as
Substrate . . /Ag/Zr/ZnO
- (E) a barrier layer based on Zr is below and in contact with the silver functional layer and an upper dielectric comprising ZnO above and in contact with the silver functional layer that can be diagrammatically represented as Substrate. . .Zr/Ag/ZnO; or
- (F) a barrier layer based on Zr is below and in contact with the silver functional layer and an upper dielectric comprising Ni-Cr, Ti or Nb above

and in contact with the silver functional layer that can be diagrammatically represented as Substrate. . .Zr/Ag/ Ni-Cr, Ti or Nb.

Reconsideration and withdrawal of the rejections applied under 35 USC 103(a) is requested.

A Notice of Allowance is requested.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.
Norman F. Oblon

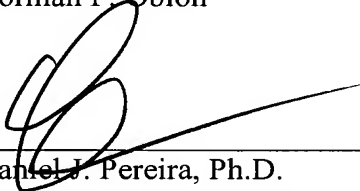
Customer Number

22850

Tel: (703) 413-3000

Fax: (703) 413 -2220

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Daniel J. Pereira, Ph.D.
Registration No. 45,518